

**TABLE 5.1-1. BENEFICIAL USES OF SURFACE WATERS OF THE LAKE TAHOE HU**

Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1.

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**TABLE 5.1-2. BENEFICIAL USES FOR GROUND WATERS OF THE TAHOE BASIN**

BASIN DWR NO.	BASIN NAME	BENEFICIAL USES					
		MUN	AGR	IND	FRSH	AQUA	WILD
6-5.01	TAHOE VALLEY -SOUTH	X	X	X			
6-5.02	TAHOE VALLEY -NORTH	X	X				

**Table 5.1-3**  
**WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES**  
**LAKE TAHOE HYDROLOGIC UNIT**

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) <sup>1,2</sup>						
		TDS	Cl	SO <sub>4</sub>	B	N	P	Fe
1	Lake Tahoe	60 65	3.0 4.0	1.0 2.0	0.01 -	0.15 -	0.008 -	--
2	Fallen Leaf Lake	50 -	0.30 0.50	1.3 1.4	0.01 0.02	See Table 5.1-4 for additional objectives		
3	Griff Creek	80 -	0.40 -	--	--	0.19 -	0.010 -	0.03 -
4	Carnelian Bay Creek	80 -	0.40 -	--	--	0.19 -	0.015 -	0.03 -
5	Watson Creek	80 -	0.35 -	--	--	0.22 -	0.015 -	0.04 -
6	Dollar Creek	80 -	0.30 -	--	--	0.16 -	0.030 -	0.03 -
7	Burton Creek	90 -	0.30 -	--	--	0.16 -	0.015 -	0.03 -
8	Ward Creek	70 85	0.30 0.50	1.4 2.8	--	0.15 -	0.015 -	0.03 -
9	Blackwood Creek	70 90	0.30 -	--	--	0.19 -	0.015 -	0.03 -
10	Madden Creek	60 -	0.10 0.20	--	--	0.18 -	0.015 -	0.015 -
11	McKinney Creek	55 -	0.40 0.50	--	--	0.19 -	0.015 -	0.03 -
12	General Creek	50 90	1.0 1.5	0.4 0.5	--	0.15 -	0.015 -	0.03 -
13	Meeks Creek	45 -	0.40 -	--	--	0.23 -	0.010 -	0.07 -
14	Lonely Gulch Creek	45 -	0.30 -	--	--	0.19 -	0.015 -	0.03 -
	continued...							

**Table 5.1-3** (continued)  
**WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES**  
**LAKE TAHOE HYDROLOGIC UNIT**

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) <sup>1,2</sup>						
		TDS	Cl	SO <sub>4</sub>	B	N	P	Fe
15	Eagle Creek	<u>35</u> -	<u>0.30</u> -	--	--	<u>0.20</u> -	<u>0.010</u> -	<u>0.03</u> -
16	Cascade Creek	<u>30</u> -	<u>0.40</u> -	--	--	<u>0.21</u> -	<u>0.005</u> -	<u>0.01</u> -
17	Tallac Creek	<u>60</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
18	Taylor Creek	<u>35</u> -	<u>0.40</u> 0.50	--	--	<u>0.17</u> -	<u>0.010</u> -	<u>0.02</u> -
19	Upper Truckee River	<u>55</u> 75	<u>4.0</u> 5.5	<u>1.0</u> 2.0		<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
20	Trout Creek	<u>50</u> 60	<u>0.15</u> 0.20	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -

<sup>1</sup> Annual average value/90th percentile value.

<sup>2</sup> Objectives are as mg/L and are defined as follows:

B	Boron
Cl	Chloride
SO <sub>4</sub>	Sulfate
Fe	Iron, Total
N	Nitrogen, Total
P	Phosphorus, Total
TDS	Total Dissolved Solids (Total Filterable Residues)

**Table 5.1-4**  
**WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES**  
**FALLEN LEAF LAKE, LAKE TAHOE HYDROLOGIC UNIT**

Constituent	Objective (See Fig. 5.1-1, location 2)
pH <sup>a</sup>	6.5 - 7.9
Temperature <sup>b</sup>	Hypolimnion - ≤15°C Bottom (105m) - ≤7.5°C at no time shall water be increased by more than 2.8°C (5°F).
Dissolved oxygen <sup>c</sup>	% saturation above 80% and DO >7 mg/L except if saturation exceeds 80% DO at bottom (105m) > 6mg/L
Total nitrogen <sup>d</sup>	0.087 <sup>e</sup> /0.114 <sup>f</sup> /0.210 <sup>g</sup>
Dissolved inorganic - N <sup>h</sup>	0.007 / 0.010 / 0.023
Total phosphorus	0.008 / 0.010 / 0.018
Soluble reactive - P	0.001 / 0.002 / 0.009
Soluble reactive iron	0.004 / 0.005 / 0.012
Total reactive iron	0.005 / 0.007 / 0.030
Chlorophyll-a <sup>i,j</sup>	0.6 / 0.9 / 1.5
Clarity	
- Secchi depth <sup>k</sup>	18.5 / 16.0 <sup>l</sup> / 13.6 <sup>m</sup>
- Vertical extinction coefficient	0.146 / 0.154 / 0.177 <sup>n</sup>
Phytoplankton cell counts <sup>o</sup>	219 / 280 / 450

<sup>a</sup> 0.5 units above and 0.5 units below 1991 maximum and minimum values. Also reflects stability of this constituent throughout the year.

<sup>b</sup> Based on 1991 data. Indicates that if temperature in the hypolimnion during the summer exceeds 15°C or if the water at 105m exceeds 7.5°C this would constitute a significant change from existing conditions. Unless there is an anthropogenic source of thermal effluent, which does not currently exist, changes in water temperature in Fallen Leaf Lake are natural. Objectives apply at any time during the defining period.

<sup>c</sup> Based on coldwater habitat protection and 1991 data base. The need for an objective for the bottom (105m) results from the desire to control primary productivity and deposition of organic matter on the bottom. A decline in bottom DO to below 6 mg/L would indicate a fundamental shift in the trophic state of Fallen Leaf Lake.

<sup>d</sup> Because of the similarity between the mid-lake and nearshore sites, Fallen Leaf Lake objectives for N, P and Fe are based on the combined mid-lake 8 m and 45 m, and nearshore 8 m concentrations. Units are mg N/L, mg P/L and mg Fe/L.

<sup>e</sup> Mean annual concentration (May - October) unless otherwise noted.

<sup>f</sup> 90th percentile value unless otherwise noted.

<sup>g</sup> Maximum allowable value; 1.5 times the maximum 1991 value. No single measurement should exceed this value unless otherwise noted.

<sup>h</sup> DIN = NO<sub>3</sub>+NO<sub>2</sub>+NH<sub>4</sub>

<sup>i</sup> Corrected for phaeophytin degradation pigments.

<sup>j</sup> Units are µg chl-a/L.

<sup>k</sup> Units are meters.

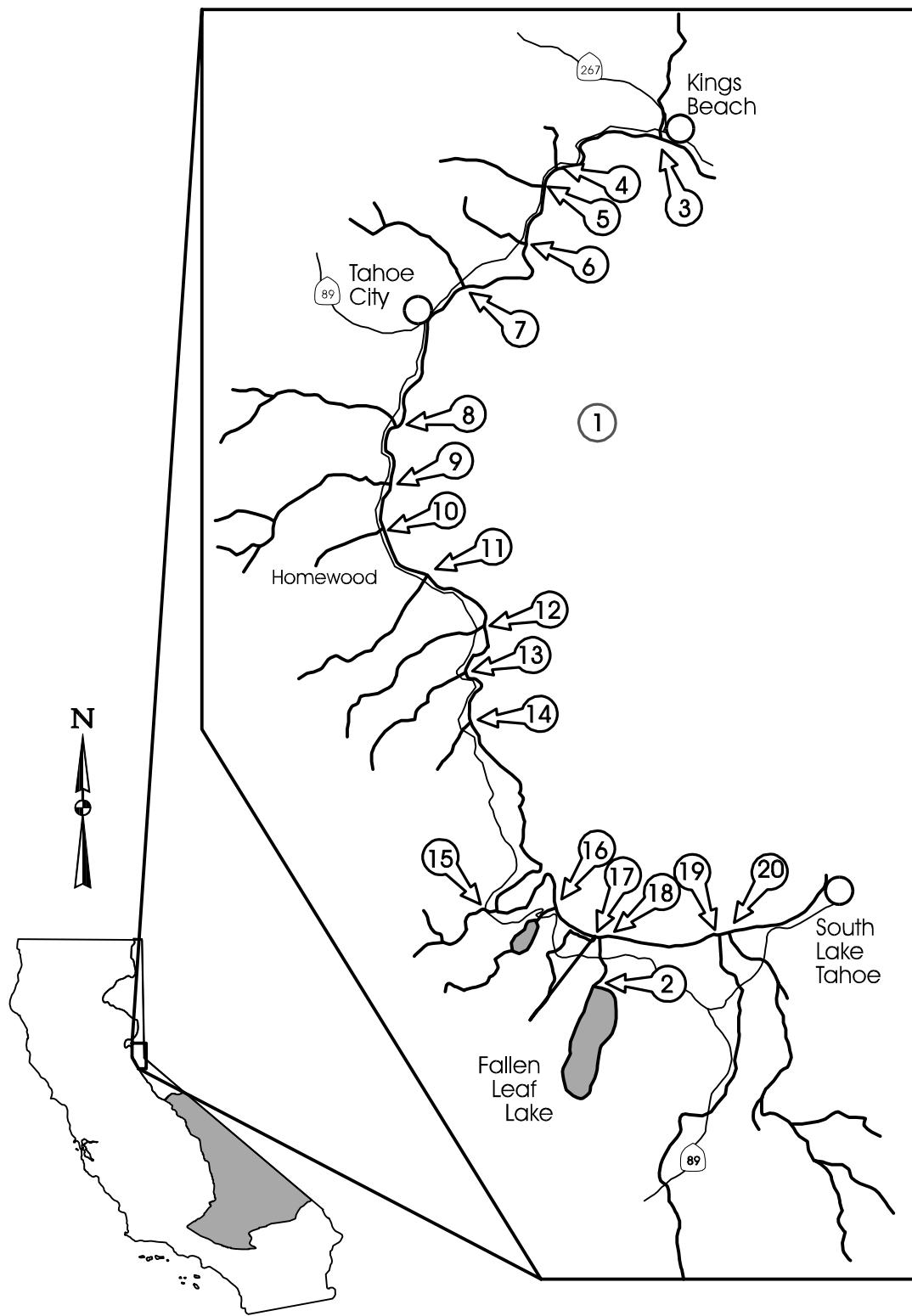
<sup>l</sup> 10th percentile since clarity increases with increasing Secchi depth.

<sup>m</sup> Represents 15% loss of clarity from 10th or 90th percentile value.

<sup>n</sup> Calculated in the photic zone between 1 m below surface to 35 m. Units are per meter.

- Units are cells per milliliter.

**Figure 5.1-1**  
**WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES**  
**LAKE TAHOE HYDROLOGIC UNIT**



**Table 5.1-5**  
**ONE-HOUR AVERAGE CONCENTRATION FOR AMMONIA<sup>1,2</sup>**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

pH	Temperature, °C						
	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH <sub>3</sub> )							
6.50	0.0091	0.0129	0.0182	0.026	0.036	0.036	0.036
6.75	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
7.00	0.023	0.033	0.046	0.066	0.093	0.093	0.093
7.25	0.034	0.048	0.068	0.095	0.135	0.135	0.135
7.50	0.045	0.064	0.091	0.128	0.181	0.181	0.181
7.75	0.056	0.080	0.113	0.159	0.22	0.22	0.22
8.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.25	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.50	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.75	0.065	0.092	0.130	0.184	0.26	0.26	0.26
9.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
Total Ammonia (mg/liter NH <sub>3</sub> )							
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

1 To convert these values to mg/liter N, multiply by 0.822

2 Source: U. S. Environmental Protection Agency. 1986. Quality criteria for water, 1986. EPA 440/5-86-001.

**Table 5.1-6**  
**FOUR DAY AVERAGE CONCENTRATION FOR AMMONIA<sup>1,2</sup>**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

pH	Temperature, °C						
	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH <sub>3</sub> )							
6.50	0.0008	0.0011	0.0016	0.0022	0.0022	0.0022	0.0022
6.75	0.0014	0.0020	0.0028	0.0039	0.0039	0.0039	0.0039
7.00	0.0025	0.0035	0.0049	0.0070	0.0070	0.0070	0.0070
7.25	0.0044	0.0062	0.0088	0.0124	0.0124	0.0124	0.0124
7.50	0.0078	0.0111	0.0156	0.022	0.022	0.022	0.022
7.75	0.0129	0.0182	0.026	0.036	0.036	0.036	0.036
8.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.25	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.50	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.75	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
9.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
Total Ammonia (mg/liter NH <sub>3</sub> )							
6.50	3.0	2.8	2.7	2.5	1.76	1.23	0.87
6.75	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.00	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.25	3.0	2.8	2.7	2.6	1.77	1.24	0.88
7.50	3.0	2.8	2.7	2.6	1.78	1.25	0.89
7.75	2.8	2.6	2.5	2.4	1.66	1.17	0.84
8.00	1.82	1.70	1.62	1.57	1.10	0.78	0.56
8.25	1.03	0.97	0.93	0.90	0.64	0.46	0.33
8.50	0.58	0.55	0.53	0.53	0.38	0.28	0.21
8.75	0.34	0.32	0.31	0.31	0.23	0.173	0.135
9.00	0.195	0.189	0.189	0.195	0.148	0.116	0.094

1 To convert these values to mg/liter N, multiply by 0.822.

2 Source: U. S. Environmental Protection Agency. 1992. Revised tables for determining average freshwater ammonia concentrations.

**Table 5.1-7**  
**EXAMPLE AMMONIA SPREADSHEET OUTPUT**  
**(USEPA AMMONIA CRITERIA CALCULATOR\*)**

Required user inputs: 1-h Temp. Cap = 20°; 4-d Temp. Cap = 15°; Temp., °C = 10;  
 pH = 7.0

One-hour criteria not to exceed, mg/L as NH<sub>3</sub>

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.000	1.000	1.000
FPH	2.810	2.810	1.000	2.810	2.810	1.000
Unionized NH <sub>3</sub>	0.0464	0.0464	0.1303	0.0925	0.0925	0.2600
Total NH <sub>3</sub> +NH <sub>4</sub>	25.0369	25.0369	70.3414	49.9552	49.9552	140.3495

Four-day criteria not to exceed, mg/L as NH<sub>3</sub>

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.413	1.413	1.413
FPH	2.810	2.810	1.000	2.810	2.810	1.000
RATIO	28.899	13.500	13.500	28.899	13.500	13.500
Unionized NH <sub>3</sub>	0.0049	0.0106	0.0297	0.0070	0.0149	0.0420
Total NH <sub>3</sub> +NH <sub>4</sub>	2.6657	5.7064	16.0322	3.7654	8.0605	22.6461

Chemical thermodynamic constants\*\*

$$\text{pKa} = 9.731432321$$

$$f = 0.001852518$$

\* A Microsoft Excel spreadsheet

Use only that temperature and pH column which applies to the input data

T = Temperature, °C; TCAP = Temperature Cap, °C

\*\* pKa: -log K; K is equilibrium constant for ammonium

f is the fraction of unionized NH<sub>3</sub>/(Total NH<sub>3</sub>+NH<sub>4</sub>)

**Table 5.1-8**  
**WATER QUALITY CRITERIA FOR**  
**AMBIENT DISSOLVED OXYGEN CONCENTRATION<sup>1,2</sup>**

	Beneficial Use Class	
	COLD & SPWN <sup>3</sup>	COLD
30 Day Mean	NA <sup>4</sup>	6.5
7 Day Mean	9.5 (6.5)	NA
7 Day Mean Minimum	NA	5.0
1 Day Minimum <sup>5,6</sup>	8.0 (5.0)	4.0

- <sup>1</sup> From: USEPA. 1986. Ambient water quality criteria for dissolved oxygen. Values are in mg/L.
- <sup>2</sup> These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column (SPWN), the figures in parentheses apply.
- <sup>3</sup> Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching (SPWN).
- <sup>4</sup> NA (Not Applicable).
- <sup>5</sup> For highly manipulatable discharges, further restrictions apply.
- <sup>6</sup> All minima should be considered as instantaneous concentrations to be achieved at all times.